

Devi Ahilya University, Indore, India Institute of Engineering & Technology				IV Year B.E. (Electronics and Telecommunication)			
Subject Code & Name	Instructions Hours per Week			Credits			
ETR8E4 DBMS AND DATA ANALYTICS	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	2	3	1	1	5

Learning Objectives:

- To understand the need of databases, its architecture and schemas.
- To familiarize students with representing domains using entity-relationship modelling.
- How to design a normalized schema in the relational data model.
- Develop skills in students to implement schema and query using SQL.
- Develop ability to develop database applications based on the requirements.

Prerequisites: Knowledge of Data Structures and Computer Programming and some topics of operating systems

COURSE CONTENTS

Unit-I Introduction: Database Environment:

Basic Concepts, Advantages of Database approach, Comparison with Traditional file systems, DBMS Architecture, Database Users, Data Models and Schemas, Database languages and Interfaces; Database development process: Development Lifecycle, Types of Application.

Unit-II Database Analysis & Modeling:

Introduction to Data Analysis and Modeling, Modeling the rules, Entity Relationship Model, ER Model Constructs- Attributes, Relationship etc., Enhanced ER Model and Business Rules, Modeling Enhanced relationships – Specialization and Generalization, Union Types. Binary and Ternary relationship Issues.

Unit-III Database Design:

Introduction to Logical Database Design, Relational Data Model – Codd’s Rules, Relational Algebra etc.; Integrity Constraints, Transforming ER diagrams into relations, Functional Dependencies, Normalization – 1NF, 2NF, 3NF, BCNF and 4NF etc.

Unit-IV System Implementation & Transaction Processing:

Introduction to SQL – Inserting , Updating, and Deleting data, Processing Single Tables, Processing Multiple Tables, PL/SQL Constructs - Views, Triggers, Cursors etc; Transaction

Processing – Properties, Schedules and Serializability Issues. Concurrency Control – Introduction, Locking etc.

UNIT V- Introduction to Big Data Platform:

Challenges Of Conventional Systems – Web Data – Evolution Of Analytic Scalability, Analytic Processes And Tools, Regression Modeling, Multivariate Analysis, Bayesian Modeling, Inference And Bayesian Networks, Support Vector And Kernel Methods, Analysis Of Time Series: Linear Systems Analysis, Nonlinear Dynamics – Rule, Introduction To Streams Concepts – Stream Data Model And Architecture – Stream Computing, Sampling Data In A Stream – Filtering Streams – Counting Distinct Elements In A Stream – Estimating Moments – Counting Oneness In A Window – Decaying Window – Realtime Analytics Platform(RTAP) Applications

Learning Outcomes:

Upon Completing the Course, Student will able to:

- Understand the fundamentals of relational database system including: data models, database architectures and database manipulations.
- Understand the theories and techniques in developing database applications and be able to demonstrate the ability to build databases using DBMS such as MySQL.
- Be familiar with managing database systems.
- Understand new developments and trends in databases.

BOOKS RECOMMENDED:

- [1]. Fundamentals of Database Systems, By R. Elmasri and S. Navathe, 6th Ed. Pearson Education, 2010.
- [2]. Database System Concepts, By A. Silberschatz, H. Korth and S. Sudarshan, 6th Ed. McGraw Hill Education, 2013.
- [3]. A First Course in Database Systems, By J. Ullman, J. Widom, 3rd Edition, Pearson Education, 2014.
- [4]. Database Systems, By T. Connolly and C. Begg, 4th Edition, Pearson Education, 2008.
- [5]. Database Management Systems, R. Ramkrishnan and J. Gehrke, 3rd Edition, McGraw Hill Education, 2014.
- [6]. MySQL : The Complete Reference, 1st Edition, McGraw Hill Education, 2004.

List of Practical Assignments:

During the learning of course, students need to do assignments:

1. Designing an E-R model.
2. Solving basic SQL assignments.
3. Solving intermediate SQL assignments involving Nested and Join queries.
4. Using PL/SQL constructs involving procedures, triggers, views etc.
5. Exploring how transaction processing is handled by MySQL.